expedition, and I think the new discoveries which I now communicate to the *Geological Magazine* may urge on the despatch of such expeditions as I propose. If these expeditions be made, how many changes may be produced in actual and general ideas on the age of the South American fossiliferous strata, on the disappearance of the lost southern lands, and on the affinities of extinct faunas so distant in time and space as those of South America and Australia!

MR. JOHN CORDEAUX.

By the death of Mr. John Cordeaux, ornithology loses, not only one of its most ardent votaries, but one who had pursued, if he did not strike out for himself, a line very different from that taken by most British lovers of birds. For nearly six-and-thirty years, as shown by a long series of contributions, chiefly to *The Zoologist*, he applied himself to the study of the phenomena of bird-migration, at first as exhibited on the coasts of Lincolnshire (in which county he lived) and Yorkshire. This led him in the autumn of 1874 to go to Heligoland for the sake of comparing notes with the now well-known Herr Gätke, whom, it is believed, he was the first British ornithologist to visit; and he soon after wrote for *The Ibis* (1875, pp. 172-188) a notice of the very wonderful collection formed by that naturalist on that island. In 1879 he joined Mr. Harvie-Brown (who had just communicated a remarkable paper to the Natural History Society of Glasgow) in a successful attempt to procure observations on migrating birds from the keepers of lighthouses and lightships on the coasts of England and Scotland; and in the following year, when the results of their inquiry were brought before the British Association at the Swansea meeting, he was named secretary of a committee appointed to continue systematically the scheme which they had shown to be practicable. Of this committee, which (with a slight variation of title) has since been annually reappointed, he has always been the hardworking secretary, and it is not too much to say that nearly all its success is mainly due to him. He not only arranged with the authorities for the distribution of the schedules, instructions, and other information necessary for the observers, but, by his own efforts, raised by subscription a large sum of money to meet the expenses of the inquiry, which proved to be far greater than had originally been anticipated. The time and trouble which all this involved were at first enormous; and, even to the last, the correspondence which he had to carry on was immense, yet his services were as willingly rendered as though he had been handsomely paid for them, instead of giving them gratuitously, and the way in which he contrived to interest the men at the lighthouses and lightships in the undertaking was marvellous. The results of this labour, continued without intermission for nine years, were partly shown by the admirable "Digest of the Observations," made by Mr. W. Eagle Clarke, which the committee was able to include in its report presented to the Association at Liverpool in 1896; and, as has been announced, that gentleman is still occupied in working out further details from the mass of materials that has been collected.

Mr. Cordeaux made more than one visit to Heligoland, and is understood to have been instrumental in bringing about the publication of an English translation of Gätke's celebrated work, though never committing himself to the adoption of his friend's views on many points. Indeed, he abstained on principle as much as possible from advocating any theories on the subject of migration, being convinced that much more knowledge had to be acquired from observation before more than a few first principles could be safely accepted. That he was the life and soul of the Migration Committee is beyond all doubt. His happy tact and sanguine temperament overcame all difficulties, though—especially from the financial point of view—they were at times so formidable as to threaten the abandonment of the work; yet by his care funds were always found to carry it on, eking out the successive and by no means illiberal grants of the British Association. He is said to have been very successful as a lecturer, and he often lectured on some ornithological subject, especially on the migration of birds, in the towns of Yorkshire and other parts of the country.

Forty papers are credited to Mr. Cordeaux in the Royal Society's Catalogue up to 1883, a number which might possibly be doubled now, and in addition to these he was the author of an unassuming but well-written little book, "Birds of the Humber District," published in 1872, a new edition of which it had been his intention to bring out. He died, after a short illness, at his residence, Great Cotes House, in Lincolnshire, on August 1, in the sixty-ninth year of his age, deeply lamented by all who had been associated with him in the work he so indefatigably carried out.

A. N.

NOTES.

We much regret to record that the serious illness of Prof. R. W. Bunsen, referred to in last week's Nature, has ended fatally. An account of the chief work of this world-renowned chemist appeared nearly twenty years ago in our Series of Science Worthies (vol. xxiii.), and we hope to publish a further appreciation of the deceased investigator next week.

The funeral of Sir Edward Frankland took place at Reigate on Tuesday. There were present, in addition to the immediate relatives, Sir Frederick Bramwell, Lord Lister, Sir Henry Roscoe, Sir Myles Fenton, Sir Michael Foster, Dr. Ludwig Mond, Dr. Thorpe, and others. The Rev. Prof. Bonney conducted the funeral service. Many wreaths adorned the coffin, including one from the Fellows of the Institute of Chemistry and one from the Chemical Society.

Major Ronald Ross, the leader of the expedition sent to Sierra Leone by the Liverpool School of Tropical Diseases to investigate the possibility of exterminating the malaria-bearing mosquito, has sent to Liverpool the following cablegram: "Malarial mosquito found. Ask Government to send at once men." Major Ross's observations in India indicated that the malaria parasite is borne by the spotted-winged mosquitoes, and not by the common brindled or grey mosquitoes; and his message announces that he has found that malaria on the West Coast of Africa is produced under the same conditions as in India. There is evidence that the malaria-bearing species only breeds in small isolated collections of water which can be easily dissipated, but the expedition has not yet had time to verify this point.

The presence of bubonic plague in Portugal has been officially notified to the Local Government Board. Oporto has been declared to be infected, and the other ports of Portugal are considered suspected. Port sanitary authorities in this country have been instructed in the precautions to be observed to prevent the introduction or spread of the disease here.

It is announced that Sir Edmund Antrobus is desirous of selling Stonehenge, the famous and mysterious monument on Salisbury Plain. Thinking it right that the nation should have the opportunity of purchasing this great relic of antiquity, the owner has offered it to the Government, with about 1300 acres of surrounding land (subject to certain pasturage and sporting rights), for the sum of 125,000*l*.

PROF. GEORGE FORBES, F.R.S., has just visited the Niagara Falls Company, and he describes in the *Times* the remarkable success which the Company has attained in the use of the Falls to develop electric energy. An enormous number of factories has been established on the Company's land, and they use between them no less than 34,590 horse-power. Additions are to be made in October, and two new works, the Atchison Graphite Company and the Lead Reduction Company (Litharge), will be supplied, bringing the total up to 45,190 horse-power contracted for, with an income of over 150,000*l*. The operating expenses do not exceed 25,000*l*. per annum. The result indicates, among other matters, the strides which have been taken of late years in electro-chemical and metallurgical processes. With regard to the machinery, the dynamos, which were totally new, not only in size but in their general design, never give the slightest trouble; and the transformers, ranging up to 2500 horse-power, have answered their purpose perfectly, even with the low frequency of alternations, which was generally condemned when Prof. Forbes introduced it, but is recognised now by every one at Niagara as contributing largely to the success of the scheme.

THE Wellman Polar expedition, which left Tromsö, Norway, on June 26, 1898, returned there from Franz Josef Land on August 17, on the s.s. *Capella*, which took the party on board at Cape Tegetthof. Mr. Walter Wellman's intention was to make a rush to the North Pole. According to the Reuter telegram received on Saturday last, an outpost was established as far north as latitude 81°, and two men were left in it to spend the winter, while the main party returned to Cape Tegetthof (lat. 80°). In the middle of February last, in the depth of winter, Mr. Wellman, with three Norwegians and forty-five dogs, started northwards. On reaching the outpost the two men were found, but one had been dead for two months. Pushing northwards the party discovered land north of the Freeden Islands, where Nansen landed in 1895. In the middle of March, when all hands were confident of reaching latitude 87° or 88°, if not the Pole itself, Mr. Wellman, while leading the party, fell into a snow-covered crevasse, seriously injuring his leg, and the party was therefore compelled to retreat. Two days later they were roused at midnight by an earthquake, and in a few moments many dogs were crushed and sledges destroyed. Mr. Wellman's condition became alarming on account of inflammation, but his companions dragged him on a sledge, making forced marches for nearly 200 miles to the headquarters of the expedition, where they arrived early in April. The *Capella* arrived at Cape Tegetthof on July 27, and sailed homeward with the party on August 10. Though the expedition has thus ended in failure so far as reaching the North Pole is concerned, it is stated that important scientific observations have been made by Dr. Hoffmann (naturalist), Mr. Harlan (physicist), and Mr. W. B. Baldwin, of the U.S. Weather Bureau, who accompanied the expedition as meteorologist and second in command.

PROF. BALBIANI has just died at Meudon at the age of seventy-five years. The following particulars of his career are given in the *Lancet*: As Professor of Comparative Embryology at the College of France he was formerly assistant to Claude Bernard at the Museum. Although descended from an Italian family he was born at Havana, and pursued his medical studies at Frankfort-on-the-Main before going to Paris. His reputation was world-wide, and he leaves a considerable number of works, of which the best known deal with the constitution of the egg, the embryonic vesicle, cellular division, the reproductive process in infusoria and aphides, and silkworm disease. He had been many times a laureate of the Institute, but, despite most pressing invitations on all hands, he never presented himself as a candidate at the Institute or Academy of Medicine where he would certainly have been elected. He wished only to be a member of the Society of Biology, of which he was one of the oldest and most industrious members. Besides, for many years past he did not himself lecture, but devoted his time more and more exclusively to the laboratory, leaving his lecture work to his assistant, Dr. Hennegy. Prof. Balbiani was, with Prof. Ranvier, editor of the *Archives d'Anatomie Microscopique*.

THE *Times* correspondent at St. Petersburg announces that a new regulation on Russian weights and measures was officially published on August 18. The Russian pound is fixed as the standard of mass and declared to be equal to 409·512 grams, a pail or vedro is to hold 30 pounds of distilled water at 16°·6 C., and a garnietz 8 pounds of water. The unit of length is the arshin, equal to 71·12 centimetres. The metric system is to be optional, and may be used with the Russian in commerce in dealing with contracts, accounts, &c., and after mutual agreement by State and municipal authorities. Private persons are, however, to be under no compulsion to use the metric system when dealing with the above-named authorities.

THE *Scientific American* states that the creation of a great national forestry and game preserve in northern Minnesota, embracing 7,000,000 acres around the headwaters of the Mississippi River, with many lakes of rare beauty, well stocked with fish, will be advocated before the U.S. Congress next winter by prominent citizens of Chicago and Minnesota. It is believed that the promoters of the plan will not experience much difficulty in interesting Congress. The game and the virgin forests of the United States are disappearing so rapidly that it is exceedingly important that measures be taken, before it is too late, to save some of the great wooded areas of the continent.

UNDER the auspices of the Philadelphia Commercial Museum and the Franklin Institute, a National Export Exposition for the advancement of American manufactures and the extension of the export trade will be held from September 14 to November 30. At the end of last year the U.S. Congress voted 350,000 dollars in support of the exposition, and other funds, amounting to 100,000 dollars, have been provided by the City Councils of Philadelphia and private subscriptions. The exposition grounds comprise a tract of land, fifty-six acres in extent, granted to the Philadelphia museums by the city of Philadelphia, and another tract of six acres secured for the uses of the exposition. Of the five structures comprising the main exhibition buildings three are permanent, but will only be completed at the present time sufficiently for the purposes of the exposition. These three permanent pavilions will have two stories. They will each be 380 feet long and 90 feet wide. The space between them will be covered by temporary buildings connected with the pavilions, the whole forming a single harmonious edifice. The permanent buildings will eventually become the home of the Philadelphia museums. One of the chief events to take place in connection with the exposition will be the International Industrial and Commercial Congress, which will assemble in Philadelpnia, beginning on October 10. A number of foreign Governments have accepted the invitation to send official envoys, and almost every city of the United States and Canada with a population over 10,000 will be represented by delegates from their Boards of Trade, Chambers of Commerce, &c. Of special interest to the members of the Franklin Institute will be the ceremonies in commemoration of the seventy-fifth anniversary of the Society, which will be held in one of the exposition buildings. The arrangements for this event contemplate a series of commemorative meetings, beginning Monday evening, October 2, and occupying the entire week. The evenings of the week will be occupied successively by the Sections in the order of seniority, beginning with the Chemical Section.

A SERIES of six articles "by a Contributor," which appeared in the *Banffshire Journal*, has been reprinted as a pamphlet entitled "Prof. McIntosh on Trawling and Trawling Investigations: a criticism and analysis." It is written with evident detailed knowledge of the work of the Scottish Fishery Board, and of fishery matters in general. Prof. McIntosh's tables and statistics are carefully analysed—the object being to show that the conclusions in his book, "The Resources of the Sea," are invalidated by the errors which have crept in in the transcribing and re-arranging of an enormous mass of figures from the Annual Reports of the Fishery Board. The matter in dispute is of such importance that the Fishery Board for Scotland in their next report should definitely and authoritatively state whether or not they accept Prof. McIntosh's statements as to the results of the trawling experiments off the Scottish coast, and, if not, what grounds they have for arriving at a different conclusion.

THE Meteorological Council have published a valuable contribution to maritime meteorology, viz. Meteorological Charts of the Southern Ocean between the Cape of Good Hope and New Zealand. The region embraces latitude 30° to 60° S. and longitude 10° to 180° E., and the charts show, for each month of the year, the wind direction and force for areas of 3° of latitude by 10° of longitude, the barometrical pressure by isobars, temperature of air and sea by isotherms, and ocean currents, in addition to other useful data. The publication will add considerably to the information hitherto available for this part of the ocean, and will therefore be very serviceable to navigators. Introductory remarks draw attention to all the leading results shown by the charts, and to the broad features of the distribution of barometric systems and of air and sea temperature. In the preparation of this work, observations for each four hours have been extracted from about 2450 logs kept for the Meteorological Office or on board H.M. ships, being all that were available between the years 1855 and 1895, and also from numerous logs of private shipping companies.

"SYMONS's British Rainfall" (Stanford) for 1898 contains not only the usual statistics and conclusions referring to the distribution of rain over the British Isles last year, but also several articles of general meteorological interest. Thirty-five self-recording rain gauges have been described in previous volumes, and eight more are described in the present report, several of them being illustrated by diagrams showing the principles of construction. In an interesting note Mr. Symons tests the general proposition that the annual rainfall increases with the elevation of the locality above the sea, by applying it to the English lake district. The highest station considered was at Sca Fell Pike (3200 feet), and the lowest Greenside Mine (1000 feet). Grouping the stations according to altitude in zones differing by 500 feet, no sign of increase or decrease of rainfall with altitude was found—in fact, the lowest group (1000-1499 feet) and the highest (3000 upwards) had identical annual precipitations, viz. 99·3 inches. Moreover, the rainfall at twenty-nine stations having annual amounts of 100 inches or more were arranged according to precipitation, but little evidence was afforded of an increase with elevation, and many of the results point to a conflicting conclusion. For instance, Seathwaite (altitude 422 feet) has an annual rainfall of 135 inches, while at Seatoller Common (2000 feet) the fall is 126 inches; Dungeon Gill and Ullscarf have both the same fall, though the altitude of the former is 311 feet, while that of the latter is 2100 feet. Mr. Symons concludes: "All these cases show that altitude alone has little influence on the amount of rainfall, and that in a mountainous country attention should chiefly be directed to the trend of the hills and valleys in relation to the rain-bearing winds."

DR. HERGESELL, of Strassburg, has contributed to the *Illustrated Aeronautical Magazine* (No. 4, *Jahrgang* 1899) a mathematical investigation of the theoretical vertical movements of a free balloon. The subject engaged the attention of Mr. J. Glaisher in the *Encyclopaedia Britannica*, and is of considerable interest for scientific balloon navigation. The first case considered is that of the ascent of an imperfectly inflated balloon, and the formulæ give the velocity attained in a stratum of air of a definite density, *i.e.* at a definite altitude, and the time required in reaching this stratum. In the case of a perfectly inflated balloon, the investigation shows that the maximum height that can be attained depends entirely upon the lifting power, and that it is independent of the velocity of ascent, and of the resistance of the air. In the case of the descent of a balloon, it is shown that the velocity of the fall does not continually increase, as is often stated, but, on the contrary, decreases, and that there is no danger in allowing the balloon to descend from a great altitude without throwing out ballast, as the velocity of the descent decreases according to the greater height from which the descent is made.

M. J. LIPPMANN, writing in the *Journal de Physique* for August, proposes the adoption of an absolute measure of time based on the Newtonian constant of gravitation. The possibility of establishing such a unit depends on the property that the Newtonian constant is independent of the units of length and mass, and is of minus two dimensions in time; hence, by making the constant of gravitation equal to unity, an absolute unit of time is obtained which is found to be equal to 3862 seconds of mean time approximately. The afore-mentioned property, however, involves the assumption that the unit of mass is of the same dimensions as the unit of volume; in other words, that density is of no dimensions. Strictly speaking, M. Lippmann's time unit is of $-\frac{1}{2}$ dimensions in density, and therefore its value depends on the nature of the standard substance chosen as the unit of density. The proposal practically amounts to this: instead of adopting an astronomical unit of density (corresponding to the astronomical unit of mass) based on taking the mean solar second as unit of time, we are to adopt an absolute unit of time based on taking water as the unit of density.

THE *Atti dei Lincei* contains in recent numbers two somewhat closely allied papers on thermo-electricity. The first of these is a verification of the principle of thermodynamic equivalence for bimetallic conductors, by Signor Paolo Straneo, who concludes not only that thermo-electric phenomena proceed regularly in perfect accordance with theory, but that they can be studied with sufficient exactness by temperature-observations without having recourse to calorimetry. The determination of the Peltier-effect coefficient by the author's method succeeds even in the case in which previous methods are wanting in accuracy, namely, when the two metals possess a high specific resistance and a feeble Peltier-effect. With the present method, the Joule effect only slightly affects the phenomenon under consideration.

SIGNOR STRANEO's method forms the basis of a paper by Signor A. Pochettino on variations of the Peltier-effect in a magnetic field. The value of the Peltier-effect coefficient was observed to vary with the magnetisation. In Signor Pochettino's experiments, it increased up to a maximum value of 0·008968, corresponding to a field of ninety-eight units, and then decreased, reaching its normal value (0·008824) in a field of about 345 units, and continuing to decrease as the intensity of the field was further increased. The formula deduced from Houllevigue's experiments, combined with Thomson's formula, only represents the phenomenon up to a field of 700 units. Lastly, the variation of the Peltier-effect coefficient is independent of the direction of magnetisation; in fact, in suitably-arranged experiments it is found that when the stationary temperature is attained, no changes take place in the thermal conditions of the conductors when the magnetising current is reversed.

IN a report received by the Foreign Office, Sir William Garstin has called attention to the need for a scientific examination of the Sudan, with a view to the development of its natural resources. It is pointed out that a very possible source of future wealth to the Sudan lies in the vast forests which line the banks of the Upper Blue Nile and extend, in an easterly direction, to the Abyssinian frontier. In the Bahr-el-Ghazal province also, particularly in the Bongo country, large forest tracts exist. The ebony tree (*Dalbergia melanoxylon*) is met with south of Karkauj, on the Blue Nile, and again in the vicinity of the Sobat River. On the White Nile, in the Bongo and Rohl districts, the india-rubber creeper (*Landolphia florida*) is found in great profusion. If the rubber yielded by this creeper be not of quite so good a quality as that obtained from the Assam india-rubber tree (*Ficus elastica*), it is still of sufficient value to be counted as an important asset in the future trade of the Sudan. The Assam india-rubber tree should certainly flourish well in most parts of the Sudan, more particularly south of Khartoum. Although this tree takes from twenty to thirty years to arrive at a girth sufficient to permit of regular tapping, its yield is so valuable (about 3*l.* per tree per annum) that its introduction into the country is well worth attempting. It is very much to be hoped that a scientific examination of the Sudan forests may ere long be carried out under the superintendence of an expert. It is certain that much valuable information would be obtained from his report. Very little is known regarding the possibilities of mineral wealth in the Sudan. Until the country is more settled, an investigation of the mountainous regions of Kordofan and Darfur on the west, and of the Abyssinian frontier on the east, would be impossible. Iron ore is found in the Bahr-el-Ghazal province, and also in Darfur; while gold mines were at one time worked in the mountains south of Fazogl. Could coal be discovered, it would make a great change in the whole question of the Sudan. In a few years' time it is probable that the Geological Survey Department of Egypt will be able to depute parties to examine the Sudan. For the present, Sir William Garstin thinks nothing can be done.

"VARIATION and Sexual Selection in Man" is the title of a paper by E. Tenney Brewster in the *Proceedings* of the Boston Society of Natural History (vol. xxix., 1899, p. 45). The author offers evidence to prove that *conspicuous dimensions tend to be more variable than other dimensions*. Not only is the face more variable than the head, but the nose should be more variable than the head; the face without the nose should be more variable than the head; and the nose should be more variable than the rest of the face. The author also suggests that sexual selection has brought it about that parts of the body tend to be more variable in proportion as they are of greater æsthetic value.

THE Report of the South African Museum for 1898, issued as a Parliamentary Paper, by the Director, Mr. W. L. Sclater, is satisfactory reading. It appears that in all departments the collections are steadily increasing; while great attention is being paid to the proper exhibition of suitable specimens. In the Geological Department a good collection of the rocks of the Kimberley mining district is already displayed; and steps are being taken for the formation of a complete collection of the economic mineral products of South Africa. This is as it should be; and it is equally satisfactory to learn that the Director is fully alive to the necessity of procuring specimens of all the larger mammals before it is too late. The collection of South African antelopes is indeed complete, with the exception of the Gemsbok and Lichi; and specimens of these ought not to be difficult to procure. It may be hoped that, in addition to the mounted specimens, a study series (if possible in duplicate) of skins may likewise be procured. The only subject the Director has to regret is that he has been unable, chiefly from lack of funds, to continue the work of preparing popular descriptive labels for the exhibited specimens. The hope is, however, expressed that the work may be shortly resumed.

As an excellent bit of work on the local distribution of a species, attention may be directed to Dr. N. H. Alcock's history of the Hairy-armed Bat in Ireland, published in the August number of the *Irish Naturalist.* In England this Bat is found rather abundantly along the Avon valley in Warwickshire, Worcestershire and Gloucestershire; it occurs rarely in Yorkshire, and has been recorded from Cheshire. In Ireland it has been found in most of the north-eastern counties, but nowhere else. We now want to know the reason of this very local distribution; and until this is ascertained our task is but half done.

M. E. PITARD describes in *l'Anthropologie* (x., 1899, p. 281) three crania from Swiss Lake sites. The first from Point, with an index of 91·5, belongs to the Rhetian or Dissentis type, and is remarkably similar to a skull described by M. Verneau from Concise, which that author believed to belong to the Bronze Age; but M. Pitard asserts that his example is Neolithic. The other two crania were found in the same layer at Concise, and are of the Bronze Age; their indices are 77·6 and 84·6.

THE Vaï or Vei are the only negroes who possess a true and indigenous writing. They occupy a territory on the confines of Sierra Leone and Liberia. The alphabet is syllabic, and it is the only syllabic alphabet existing in Africa. The first account of this remarkable language was published by Forbes and Norris in 1849, and Koelle also wrote on it in 1849 and 1854. Since then nothing has been published thereon till the recent study of M. M. Delafosse (*l'Anthropologie*, Tome x., 1899, pp. 129, 294). Forbes and Koelle asserted that the alphabet was invented about 1829 or 1839, but Delafosse considers it at least two hundred years old and perhaps older; it is not even certain that it was invented by the Vaïs themselves. Forbes was also wrong in stating that this alphabet was no longer in use in 1849; as a matter of fact, it is still increasingly employed. Of the 226 characters in the alphabet, 25 resemble Berber consonants in form, and 20 resemble European letters and numerals; but these may be purely superficial resemblances, as the sounds do not correspond: the author does not consider that the Vaï alphabet has been derived from these sources.

SIR J. BURDON-SANDERSON asks us to notify the following errata in his MS. of the abstract of the Croonian Lecture published in NATURE of August 10. On p. 344, col. 1, line 5, for "Fig. 1" read "Fig. 2"; col. 1, line 18, for "Fig. 2" read "Fig. 1"; col. 2, line 12 from the bottom, for "60" read "40."

PART XV. of Mr. Oswin A. J. Lee's elaborate work, entitled "Among British Birds in their Nesting Haunts," has been published by Mr. David Douglas, Edinburgh. The Part contains ten beautiful plates, illustrating the nesting places and nests of the whinchat, osprey, storm petrel, yellow bunting, rook pigeon, Manx shearwater, grey wagtail, and red grouse.

HERR EUGEN VON CHOLNOKY contributes to the *Verhandlungen der Gesellschaft für Erdkunde* a short summary of the scientific results of his journeys in China and Manchuria during 1896–98. The most important contributions refer to the geology of the regions visited, and in particular to the positions of the great lines of faulting crossing Manchuria, indicated by Richthofen.

THE current number of the *Zeitschrift der Gesellschaft für Erdkunde* (vol. xxxiv, No. 2) is entirely devoted to the official reports of the members of the German deep-sea expedition in the *Valdivia.* Prof. Chun gives a narrative of the expedition and its progress; Dr. Gerhard Schott reports on the oceanographical work; and the navigating officer, Herr Walter Sachse, adds an account of the re-discovery of Bouvet Island. A summary of the contents of these reports has already appeared in these columns (p. 114).

A NUMBER of students from the Paris École Supérieure d'Électricité visited electrical works and manufactories in Switzerland at the end of last March, this being the second excursion arranged by the authorities of the School. A report upon some of the objects and installations examined was presented to the Société internationale des Électriciens in May, and has just been published as an excerpt from the *Bulletin* of the Society, by M. Gauthier-Villars, Paris.

THE additions to the Zoological Society's Gardens during the past week include a Vervet Monkey (*Cercopithecus lalandii*) from South Africa, presented by Mr. R. Hilliard; a Brown Capuchin (*Cebus fatuellus*, ♀) from Guiana, presented by Colonel Bourchier; a Common Kingfisher (*Alcedo ispida*), British, presented by Mr. John Porter; an Alexandrine Parrakeet (*Palaeornis alexandri*, ♀) from India, presented by Miss J. M. Pott; a Common Boa (*Boa constrictor*) from South America, presented by Mr. C. W. Lilley; an Alligator (*Alligator mississippiensis*) from Southern North America, presented by Commander H. Woodcock; two Grevy's Zebras (*Equus grevyi*, ♂ ♀) from Southern Abyssinia, a Malayan Bear (*Ursus malayanus*) from Malacca, deposited; three Pink-headed Ducks (*Rhodonessa caryophyllacea*, ♂ ♀ ♀) from India, six Edible Frogs (*Rana esculenta*), European; twelve Paradise Fish (*Macropus viridi-auratus*) from China, purchased; a Japanese Deer (*Cervus sika*), a Puma (*Felis concolor*), a Burchell's Zebra (*Equus burchelli*, ♀), born in the Gardens.

OUR ASTRONOMICAL COLUMN.

HOLMES' COMET 1899 *d* (1892 III.).—

Ephemeris for 12h. Greenwich Mean Time.

1899.	R.A.			Decl.			Br.	
	h.	m.	s.	°	′	″	r^{-2}	$(r\Delta)^{-2}$
August 24	2	57	44·22	+38	17	15·7	0·1888	0·04999
25		58	33·92	38	32	21·3		
26	2	59	22·11	38	47	22·9		
27	3	0	8·77	39	2	20·4		
28		0	53·85	39	17	13·7	0·1869	0·05109
29		1	37·31	39	32	2·7		
30		2	19·13	39	46	47·1		
31	3	2	59·26	+40	1	26·8		

During the ensuing week the comet is in a good position for observation by observers having sufficient optical power; it passes closely to the south of the second magnitude variable star β Persei (Algol).

THE PARIS OBSERVATORY.—The annual report of M. Lœwy, the director of the Observatory, contains a detailed review of the work accomplished during the past year.

Special attention has been devoted to the improvement of meridian observations, chiefly in the attempt to eliminate instrumental errors by greater precision and stability of the mountings.

The small equatoral coudé has been provided with several accessories, and the building covering it so altered that the whole is now adapted for astrophysical observations.

The volume of observations made during 1897 will shortly be published in four separate parts, by different authors, who will each be responsible for all reductions, descriptions and discussions contained in the part under their names.

The fourth part of the Paris Observatory Catalogue (of which the first three parts already published contain all the meridian observations made from 1837–1881) has just been completed. The meridian circles have been in use for fundamental observations, for a revision of Lalande's Catalogue, and for work on the variation of latitude.

Coudé Equatorial.—The large instrument has been chiefly used in obtaining further series of photographs of the moon (scale about 6·5 inches to the lunar diameter) for the large lunar atlas now in progress of publication. During the year 591 plates have been obtained for this purpose. The method of enlargement of the negatives has also been improved.

Accompanying the report is a heliogravure of the moon when 20d. 5·9h. old, reproduced the same size as the original plate.

For part of the year the photographic objective was replaced by the visual glass, and the instrument then used by M. Hamy for measuring the diameters of small celestial objects by an interference method. The satellites of Jupiter and the planet Vesta have been measured in this way, the diameter of the latter agreeing very closely with the value obtained by Prof. E. E. Barnard.

Astrographic Equatorial.—The actual photographic work is now almost completed, all that remains to be done being the replacement of a small number of defective plates. The reduction of the plates for the Catalogue is well in hand, and seven of the Chart plates have been engraved for heliographic reproduction.

"THE BULLETIN ASTRONOMIQUE."—The August number contains several interesting and suggestive articles.—M. Flammarion contributes an article on "The World of Jupiter," in which he discusses at length the question of the various rotation periods of the planet, and also an illustrated account of the observation made by M. Antoniadi at Juvisy during the opposition of June 1898.—"The Rotation of Venus" is treated mathematically by Abbé Th. Moreux, based on observations made at Juvisy by M. Antoniadi.—"Observations of Mars" (illustrated) are contributed by MM. V. Cerulli and J. Chloudoff.—MM. L. Rudaux and Em. Touchet furnish an article on the "Systematic Observation of Meteors," giving a suggested form for recording observations systematically, and dealing with the determination of radiants, the physical characters of the swarms, heights of the meteors, and the photographing of them.

THE SUN'S HEAT.—Prof. T. J. J. See contributes a further article dealing with the extension of Helmholtz's theory of the heat of the sun, in *Astr. Nach.* (Bd. 150, No. 3586). The method he now pursues is the determination of the potential of a heterogeneous sphere as caused by itself. He finds that the energy developed by the condensation on this assumption is greater than that produced in the condensation of a homogeneous sphere in the ratio of 176,868 to 100,000.

IRON AND STEEL INSTITUTE.

THE autumn meeting of the Iron and Steel Institute was held this year at Manchester, on August 15 and 16, under the presidency of Sir William Roberts-Austen, K.C.B., and was attended by an unusually large number of members. The meetings were held in the Town Hall, the members being welcomed to Manchester in eloquent speeches by the Lord Mayor and by Mr. S. R. Platt, chairman of the Executive Reception Committee. In acknowledging the words of welcome, the President referred to the services rendered to metallurgy by Dalton and Joule, and by such great engineers as Fairbairn, Whitworth and Daniel Adamson, Manchester's distinguished sons. The programme was a long and varied one, no less than ten papers being on the list. The first read was by Prof. J. Wiborgh, of Stockholm, whose contribution, which was translated and read by Mr. H. Bauerman, dealt with the use of finely divided iron ore obtained by concentrating processes. By the introduction of such methods of separation, the power of enriching iron ores has been greatly increased; but the advantages are qualified by the circumstance that the product obtained is usually in the form of fine powder, which limits its utility to the smelter. The question of how such material can best be applied is one of importance, and the author shows how the material may be utilised by direct